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A Description and Comparison of Biographical Inventories for Military Selection

Janice H. Laurence and
Barbara Means

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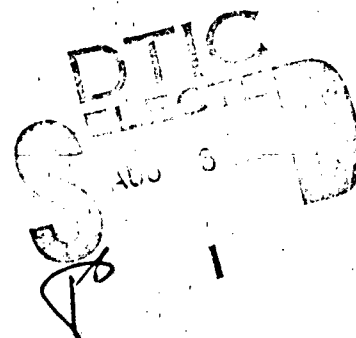
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The Military Services have been experimenting with biodata with the hopes of better identifying those recruits unlikely to adapt to military life. Although possession of a high school diploma has been shown to be the single most effective predictor of first-term attrition, there remains room for improvement. The identification of the most effective biodata items and efficient instruments may further enhance the selection of successful servicemembers. This report describes several Service and DoD biographical inventories. Specifically		

20. (Continued)

mentioned are the History Opinion Inventory (HOI), Military Service Inventory (MSI), Recruit Background Questionnaire (RBQ), Military Applicant Profile (MAP), Educational and Biographical Information Survey (EBIS), and the Armed Services Adaptability Profile (ASAP). The types of items which have shown validity for predicting military performance among these instruments were identified. Of the following 12 descriptive categories--education achievement, school behavior/attitudes, family relations, work history, status variables, arrest related, alcohol/drug use, minor behaviors, past behaviors (other), self-perceptions, military attitudes/expectations, and attitudes--the most consistently effective type of item appears to be those dealing with school behaviors and attitudes. Such items were often found to be among the top one-fifth of the various instruments' items. This report also discusses inventory formats and presents guidelines which might be useful in planning the general makeup of future biodata instruments. Finally ethical considerations involved in the use of biodata are presented.



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Foreword

Congress has urged the Department of Defense (DoD) and the Services to develop a strong foundation of empirical research upon which enlistment standards can be based. The particulars of these standards may be an important issue in planning for the coming decade when a dwindling supply of young people will be available as potential military accessions. At present, enlistees must meet minimum standards in terms of age, citizenship, physical and medical fitness, moral character, aptitude test scores, and educational level. While test scores and educational attainment have been shown to help predict military performance, current standards result in the acceptance of many persons who subsequently fail to complete their terms satisfactorily. As many as 15-20 percent of high school graduates and 30-40 percent of non-high school graduates are separated from service prior to completion of the first term because of failure to meet behavior or performance criteria.

This report was prepared by HumRRO's Manpower Analysis Program as part of a project monitored by the Office of Naval Research. That project, Predicting Military Performance from Educational and Biographical Information, capitalizes on a HumRRO-developed data base containing Educational and Biographical Information Survey (EBIS) responses for over 75,000 recent military applicants and recruits. As the individuals who took the EBIS (administered in 1983) move through their first terms of service, the predictive relationships between EBIS items and scales and various military performance measures are being analyzed.

This report compares the EBIS with other Service biographical inventories in terms of format and item content. Practical and ethical considerations for the use of biodata as a selection tool are also discussed.

This contract was performed under the technical supervision of Dr. Charles E. Davis, of ONR's Office for Personnel and Training Research. It was funded by the Directorate for Accession Policy, Office of the Assistant Secretary of Defense (Force Management and Personnel), which also sponsored the development and administration of the EBIS under an earlier project.

The authors gratefully acknowledge the contributions of individuals, both internal and external to HumRRO. Dr. W. S. Sellman, Director, Accession Policy, within the Office of the Assistant Secretary of Defense (Force Management and Personnel) and Dr. Anita Lancaster, Assistant Director of Accession Policy, provided guidance and suggestions throughout the project in addition to their valuable comments on a draft version of this report. Ms. Dona Zimmerman of the Naval Postgraduate school, and Mr. David Atwater of the Navy Personnel Research and Development Center provided valuable information on the History Opinion Inventory and Recruit Background Questionnaire, respectively.

The support within HumRRO's Manpower Analysis Program--under the management of Dr. Brian K. Waters--proved invaluable. Particularly appreciated is the assistance of Mr. Brian Stern, who provided reference materials and comments on the draft report.

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Background

Background data, particularly scored biodata forms, have been shown to be efficient, robust, and valid predictors of many industrial criteria (Owens, 1976). These criteria include turnover, absenteeism, rate of salary increase, and performance ratings for groups such as salespersons, life insurance agents, and taxicab drivers. Turnover is, by far the most common criterion which demographic, experiential, and attitudinal variables are used to predict (Casio, 1982).

The military has also been the setting for research on self-reported background or biographic information. Since World War II the Services have attempted, through biodata, to identify noncognitive characteristics related to success in the military.

More recently, the Military Services have been experimenting with biodata with the hopes of better identifying those recruits unlikely to adapt to military life. Although education (i.e., whether one possesses a high school diploma) has been shown to be the single most effective predictor of first-term attrition (Department of Defense, 1978; Flyer & Elster, 1983), there remains room for improvement. There are many non-high school diploma graduates who successfully complete a full enlistment term just as there are diploma graduates who fail to do so. The identification of the most effective biodata items and efficient instruments may further enhance the selection of successful servicemembers. Below is a description of several Service and DoD biographical and attitudinal inventories.

History Opinion Inventory (HOI). The HOI consists of 100 self-report, true/false items covering school adjustment, family stability, social orientation, emotional stability, physical complaints, motivation and expectations for achievement, and response toward authority. This inventory was developed by the Air Force and its origins date back to 1972 and the Military Adaptability Screening Test (MAST). The MAST was abandoned because of its relatively poor ability to predict basic military training success. The HOI proved more valid than its predecessor. It was administered to 15,252 airmen during basic training, and its two scales--Prediction of Emotional Instability (PEI) and Prediction of Drug Use Admission (PDA)--as well as the combined Adaptation Index (ADI) were found to be statistically significant in predicting attrition during basic training. Although aptitude scores and background variables were most predictive of attrition, the HOI scales, particularly PDA and ADI, did make a unique contribution to predicting the criterion. The HOI was reduced to 50 items and starting in 1975 has been administered to all Air Force recruits as they arrive for basic training as part of the Air Force Medical Evaluation Testing.

Military Service Inventory (MSI). The MSI is a 50-item subset of the HOI. These items were selected on the basis of their relationship to the three-year attrition criterion for the original 1972 MAST administration sample. In 1977 the MSI was given to approximately 53,000 applicants for military service over a four-month period and was found to be a valid predictor of attrition.

Recruit Background Questionnaire (RBQ). The RBQ is a 55-item self-report inventory in a multiple-choice format developed by the Navy. This

questionnaire taps areas such as work and school experiences, hobbies, interests, and family history. Approximately one-third of RBQ items are school-related. The RBQ (forms 1 and 2) was administered to 29,464 Navy enlistment applicants from December 1979 through June 1980. The validity of the RBQ for predicting recruit training and six-month attrition was determined for the 15,430 applicants who actually enlisted in the Navy. The RBQ was found to be correlated significantly with attrition, particularly for male high school graduates ($r=.28$ to $.38$). Correlations for male nongraduates ranged from $.17$ to $.21$. The range for females was $.18$ to $.26$. Items which are not related to school activities were most useful among high school graduates. Statistically significant correlations and similar results were found in the cross validation samples, though the correlations were much smaller than in the original sample. Multiple regression analyses showed that the RBQ added to the prediction of attrition above and beyond the contribution of the Navy's operational attrition screening tool known as SCREEN (Success Chances for Recruits Entering the Navy), which is based upon an actuarial prediction from such background items as age, education, number of dependents, and aptitude score.

Military Applicant Profile (MAP). The MAP is a 60-item multiple-choice biographical questionnaire covering family, academic, and work experiences, athletic/physical competence, self-concept, and social style/participation. There are four alternate forms of the MAP. This instrument is based upon decades of research performed by the Army and several previous autobiographical questionnaires. The MAP was administered to 4,282 male Army enlistees at Forts Dix and Sill from November 1976 through February 1977. The primary criterion was 180-day attrition. Analyses indicated differential

prediction for high school diploma graduates and nongraduates. The MAP was put into operation for 17-year-old nongraduate Army applicants in July 1979. On the basis of further analyses (Eaton, Weltin, & Wing, 1982) the use of this instrument was extended to all non-high school graduates.

The Educational and Biographical Information Survey (EBIS). The EBIS consists of 34 structured-response questions providing 120 items of information concerning education achievement, school behavior/attitudes, family relations, work history, status variables, arrest record, and alcohol/drug use. This instrument, developed by HumRRO under contract to the Office of the Assistant Secretary of Defense (Force Management and Personnel), was administered to over 34,000 applicants and 40,000 new recruits between February and June of 1983 with the hopes of improving existing education and moral enlistment standards. Six-month attrition has served as the primary criterion at this stage of data analysis. Future analyses will determine the relationship between EBIS items and attrition throughout the first enlistment term as well as other criteria. Preliminary results show that items predictive of attrition differ between high school diploma graduates and nongraduates.

Armed Services Adaptability Profile (ASAP). The ASAP is a Joint-Service biodata instrument currently under development. Each of the two ASAP forms consists of 130 multiple-choice items. These items were drawn from other biodata instruments which had been administered and validated using military applicants as subjects. Specifically, each form of the ASAP includes one complete form of the MAP and many questions from the RBQ. The construction, administration, data collection, and validation of this new instrument began

in February 1983 and is scheduled for completion in October 1987. Subjects consist of approximately 200,000 non-prior-service applicants tested at Mobile Examining Team (MET) sites and Military Entrance Processing Stations (MEPSs) from December 1984 through February 1985. Criterion data will be attrition after basic training, and at 180, and 360 days. Scoring keys are scheduled to be developed for each Service, across Services, and for major subject groups (i.e., male high school graduates, male nongraduates, and females) to evaluate the adequacy of a common key.

Comparisons Across Inventories

The objective of this report is to identify the types of inventory items which have shown validity for predicting military performance on a variety of instruments and for diverse military samples. Two prerequisite activities for completing this task were:

- o classification of inventory items into a standard set of categories, and
- o collection of item validity data for Service-developed instruments.

Item Classification

EBIS items had been classified into eight descriptive categories:

- o education achievement,
- o school behavior/attitudes,
- o family relations,
- o work history,
- o status variables,
- o arrest related,
- o alcohol/drug use, and
- o minor behaviors.

An initial review of the MSI, HOI, RBQ, and MAP suggested that if a single taxonomy were to be used across all of these inventories, several additional categories would be needed:

- o past behaviors (other),
- o self-perceptions,
- o military attitudes/expectations, and
- o attitudes (other).

Using the 12 resulting categories, each inventory was reviewed and items classified.¹ (These classifications, of course, used our taxonomy and would not necessarily coincide with the theoretical constructs guiding the instruments' developers.) EBIS items were reclassified using the more complex system.

The results of this review are shown in Table 1. As this table suggests, the inventories are somewhat diverse in terms of the types of self-report items appearing most frequently. Self-perception items (e.g., "How do you usually get along with other people?") dominate the MAP (composing 48 percent of its 240 items) and, to a lesser extent the MSI and HOI (roughly one-third of each). No items of this type appear on the EBIS; 18 percent of the RBQ consists of such items.

School behaviors/attitudes are prominent on these inventories. These topics are assessed in roughly one-quarter of the items on the EBIS, RBQ, HOI, and MSI and comprise 12 percent of the much longer MAP (29 items). The related category, educational achievement, is represented by 12 percent of EBIS items, 9 percent of RBQ, 8 percent of MSI, and 4 percent each of the HOI and MAP.

Family relations or stability items are most prominent on the MSI (14 percent) followed by the EBIS and HOI (11 and 10 percent, respectively), and the RBQ (7 percent). Seven items or 3 percent of the MAP deal with family relations.

¹The full ASAP was not available for content analysis at the time this report was prepared.

Table 1
Comparison of Item Types on Five Biodata Inventories
(Percent of Item Types)^a

Item Type	HUI (50) ^b	MSI (50)	RBQ (55)	MAP (240)	EBIS (120)
Educational Achievement	4	8	9	4	12
School Behavior/Attitudes	24	24	22	12	26
Family Relations	10	14	7	3	11
Work History	6	2	9	8	14
Status Variables	0	2	5	4	6
Arrest Related	0	4	4	1	13
Alcohol/Drug Use	8	2	0	1	10
Minor Behaviors	2	4	4	2	5
Past Behaviors (other)	0	0	16	6	1
Self-Perceptions	34	32	18	48	0
Military Attitudes/Expectations	8	6	5	8	0
Attitudes (other)	0	2	0	3	0

^aNumbers may not add because of rounding.

^bNumber of items.

Work history items are represented most on the EBIS (14 percent), followed by the RBQ, MAP, and HOI (9, 8, and 6 percent, respectively). Only one MSI item (2 percent) deals with work history.

Only the EBIS deals with pre-service arrests to a significant extent (13 percent). Alcohol and drug use are dealt with by the EBIS (12 items or 10 percent) and the HOI (4 items or 8 percent).

Attitudes toward the military and expectations about service are dealt with extensively by the MAP which includes 19 items in this category. To a lesser extent, military attitudes are also tapped by items on the HOI (4 items), the MSI, and RBQ (3 items each). The EBIS does not have any items of this type.

Attitudes other than those regarding military service are represented on the MAP (7 items) and by a single item on the MSI.

Thus, in summary, the EBIS places less emphasis on self-perception and military attitude items than do the other instruments. It contains a larger proportion of items concerning educational achievement, arrest and work histories, and alcohol/drug use than the other instruments.

Item Validity Data

Item validity data on the MSI were made available from the Defense Manpower Data Center (DMDC) by the Office of the Assistant Secretary of Defense (OASD) (FM&P). Comparable data on the HOI, RBQ, and MAP were requested from the appropriate Services. More specifically, the following item validity data were obtained:

- o Correlations between MSI item responses and attrition status 36 months after Service entry for 24,558 recruits (all four Services) who took the MSI at an Armed Forces Examining and Entrance Station (AFEES), now known as MEPS, in 1977. Cases were identified as to sex and graduation status.
- o Correlations for each RBQ item response with attrition status six months after service entry for 13,314 Navy and Marine Corps males (graduates and nongraduates together).
- o Correlations between HOI responses and 36-month attrition rates for 76,364 Air Force recruits given the instrument after service entry during the period between 1973 and 1978, by education status.

Thus, the available data sets were not strictly comparable. The criterion (and hence the criterion split), sample size, and predictor scale type varied across instruments. All of these factors can affect the size of obtained correlations. For our purposes, however, it was not necessary to compare directly the size of obtained correlations across instruments. We wanted to assess, within each instrument, the types of items that proved most valid for predicting attrition.

To gain a rough picture of the types of items that worked best on various surveys, we selected the top one-fifth of the items on each instrument on which validity data were available, in terms of predictive validity. Where separate validity data were available for the two education groups, the best predictors for high school graduate and nongraduate groups were both identified. The representation of various item types among the best predictors for each instrument can be seen in Table 2.

Table 2

Most Predictive Item Types Within Each of Four Biodata Inventories^a

Item Type	HUI (total)			MSI (males)			MBQ (males)			EBIS (total)		
	% Best HSG Items (10) ^a	% Best MIS Items (10)	% Total Items (48)	% Best HSG Items (10)	% Best MIS Items (10)	% Total Items (50)	% Best Items (11)	% Total Items (55)	% Best HSG Items (24)	% Best MIS Items (24)	% Total Items (120) ^c	
Ed Achievement	0	0	.04	0	.10	.10	.18	.09	.33	.02	.15	
School Beh/Attitudes	.60	.45	.25	.70	.60	.24	.36	.22	.54	.17	.26	
Family Relations	.20	.10	.10	.10	0	.16	0	.07	0	.17	.10	
Work History	0	0	.06	0	0	.02	.18	.09	0	.13	.14	
Status Variables	0	0	--	0	0	.02	0	.05	.04	.04	.06	
Arrest Related	-- ^d	--	.04	.10	0	.04	0	.04	0	.04	.13	
Alcohol/Drug Use	0	.10	.04	0	0	.02	--	--	.04	.38	.10	
Minor Behaviors	0	0	.02	0	.20	.04	.18	.04	.04	0	.05	
Self-Perceptions	.20	.25	.35	.10	0	.30	0	.18	0	0	.01	
Past Behaviors	--	--	--	--	--	--	.09	.16	--	--	.01	
Military Attitudes ^e	0	.10	.08	0	.10	.06	0	.05	--	--	--	
	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	

^aThe top one-fifth of items intermost correlation with attrition at 6 months for the EBIS and MBQ, and at 36 months for the MSI and HUI.

^bThe number of items in the top one-fifth of the distribution appears in parentheses.

^cThe EBIS contains only 34 questions, however many of these questions consist of multiple pieces of information, yielding 120 items, not including the question on state of residence.

^dNo items of this type on inventory

^eIncludes the one item on these inventories classified as "attitude-other."

The most consistently effective type of item appears to be those dealing with school behaviors and attitudes. These comprised 54 percent of the best EBIS items for high school graduates; 70 percent of the best MSI items for graduates and 60 percent of those for nongraduates; and on the HOI, 60 percent of the best items for graduates and 45 percent of those for nongraduates.

Alcohol/drug use items comprised 38 percent of the best predictors for nongraduates taking the EBIS, but did not predict well for high school graduates and were not really present in any number on the other instruments.

Education achievement items comprised 33 percent of the best EBIS predictors for high school graduates and 20 percent of the best predictors for the total validation sample for the RBQ. (We did not have separate item validities for high school graduates taking the RBQ).

Self-perception items constituted 25 percent of the best HOI predictors for nongraduates and 20 percent for graduates; 15 percent of the best predictors on the RBQ, and 10 percent of the best predictors for graduates taking the MSI.

Since the number of items of each type varied considerably both within and across instruments, it is helpful to examine the probability that an item of each type would be found among the best predictors for a given instrument, as shown in Table 3.

These data suggest that high school behavior items are probably the most consistent across instruments and education levels in terms of good predictive validity. The only notable exception to this pattern was the weaker

Table 3
Validity of Eleven Item Types on Four Biodata Inventories^a

Item Type	MOI (total)			MSI (males)			RBQ (males)			EBIS (total)		
	% Best HSG Items (10) ^b	% Best MIS Items (10)	# Total Items (48)	% Best HSG Items (10)	% Best MIS Items (10)	# Total Items (50)	% Best Items (11)	# Total Items (55)	% Best HSG Items (24)	% Best MIS Items (24)	# Total Items (120) ^c	
Ed Achievement	-.4	--	2	0	.20	5	.40	5	.44	.11	18	
School Beh/Attitudes	.50	.38	12	.58	.50	12	.33	12	.42	.13	31	
Family Relations	.40	.20	5	.25	0	8	--	4	0	.33	12	
Work History	--	--	3	--	--	1	.40	5	0	.43	17	
Stat Variables	--	--	0	--	--	1	--	3	.14	.14	7	
Arrest Related	--	--	2	--	--	2	--	2	0	.07	15	
Alcohol/Drug Use	--	--	2	--	--	1	--	0	.08	.75	12	
Minor Behaviors	--	--	1	--	--	2	--	2	.17	--	6	
Self-Perceptions	.12	.15	17	.07	0	15	0	10	--	--	1	
Past Behaviors	--	--	0	--	--	0	.11	9	--	--	1	
Military Attitudes	--	--	4	--	--	3	--	3	--	--	0	

^aProbability that an item of each type was among the top one-fifth of items in terms of correlation with attrition for each inventory.

^bThe number of items in the top one-fifth of the distribution appears in parentheses.

^cThe EBIS contains only 34 questions, however many of these questions consist of multiple pieces of information, yielding 120 items, not including the question on state of residence.

^dFewer than 5 items of this type on the instrument.

^eIncludes the one item on these inventories classified as "attitude-other."

validities for EBIS nongraduates. Education achievement items on the EBIS were useful for high school graduates, and on the RBQ worked well for the total sample.

Family relations items on the HOI had a high probability of working well for both education groups; those on the EBIS were likely to be predictive for nongraduates; those on the MSI predicted well for graduates; those on the RBQ were not among the best predictors for total sample. Work history items appeared in any numbers only on the EBIS and on the RBQ; they worked well for EBIS nongraduates and for the total RBQ sample. Demographic (status) variables, appearing on the EBIS were only moderately likely to be predictive within either educational groups. The arrest items on the EBIS were rarely good predictors. Alcohol and drug use items were represented in any strength only on the EBIS: 75 percent of them were among the best predictors for nongraduates, but none of them worked well for graduates. The minor behavior items on the EBIS had a moderate likelihood of being predictive for graduates but did not work well for nongraduates. Self-perception items had only modest probabilities of being among the most predictive items for the HOI or the MSI; past behavior items were represented sufficiently only on the RBQ, and had only a modest likelihood of falling among the best items. Military attitude/expectation items were not represented in sufficient numbers to assess their probability of being among the top predictors.

Inventory Formats

The present analyses do not lend themselves to a direct comparison of Service biodata inventory formats, let alone to determining which of the instrument's format was most effective. Despite this limitation, there are

some general guidelines which might be useful in planning the general makeup of future research and operational biodata instruments.

Owens (1976) for example, has several comments and recommendations regarding the format of biographical inventories. Biodata inventories are likely to be valid predictors if aimed at a specific target or criterion and if the instrument contains relatively few factors. Items dealing with past behavior should be favored. His specific recommendations pertain to multiple-choice formats, which are the most commonly used. Although Owens does not specifically compare this format to other types such as "true or false" formats he does caution against dichotomous items. Because of such coarse groupings, such items often lose information, and the place to make the split is not always evident. Owens recommends the use of continuous items because of increased validity and accommodating statistical analyses. Also, to avoid analytic problems, single-response options ("choose one") are preferred over multiple-response options ("mark all that apply"). The latter item format may cause responses to be too thinly spread over many response categories.

Owens offers further recommendations for increasing the reliability of a biodata inventory. First, items should be brief. Second, numbers should be used to graduate or scale and to define options. For example, when using an item such as "In the past year, how many times have you missed class?", response options such as "less than five times, five to ten times, and more than ten times" would be preferable to "seldom, sometimes, or often." Third, all options should be covered, and if this is not possible, an escape option should be provided. For example, when asking "How many part-time jobs have you had since you were 16 years old?" a response option such as "I never held

a full-time job." is needed. Owens notes that such an escape option, though at times necessary, may cause problems in analysis--for it may not be clear how to treat this response either with dichotomous or continuous items. Finally, items and stems should carry a neutral or pleasant connotation.

McKillip and Clark (1974) reviewed the biodata literature and concluded that "hard" biodata are superior to "soft" biodata. That is, items which are verifiable, based on past behavior, and deal with actual behavior tend to be better than those that are unverifiable, futuristic, or deal with hypothetical behavior. Table 4 provides examples of items within these and other "hard" and "soft" biodata item dimensions. In addition, the use of hard biodata items and particularly verifiable items may reduce faking (the tendency for respondents to answer items untruthfully). Such a lack of candor may be exasperated when the instrument is used for selection screening (Cornelius & Adamaszek, 1982). Research with the MAP has found that the instrument's validity when administered operationally to Army applicants was much reduced from that found for the experimental administration to recruits in the validation sample (Walker 1984; Haymaker & Erwin, 1980).

With the exception of the references cited above, there is little in the literature pertaining specifically to the construction of biodata inventories. However, general guidelines for survey construction abound and are applicable to biodata instruments as well. In addition to the guidelines covered above (e.g., item brevity, exhaustive, and mutually exclusive responses), Babbie (1973) describes the need for a questionnaire format that is spread out and uncluttered. Provisions should be made for responses to be marked clearly (e.g., avoiding open blanks for check marks). Both Babbie (1973) and Rubin (1983) present a few additional recommendations regarding question construction as outlined below.

Table 4

Examples of "Hard" and "Soft" Biodata Dimension Items

"Hard" Dimensions

"Soft" Dimensions

Verifiable

How many full-time jobs have you had in the past 5 years?

Historical

List your three best subjects in school.

Actual Behavior

Did you ever build a model airplane that flew?

Memory

Before you were 12 years old, did you every try to perform chemistry experiments at home?

Factual

Do you repair mechanical things around your home such as appliances?

Specific

As a child did you collect stamps?

Response

Which of the following types of cameras do you own?

External Event

Did you ever have private tutoring lessons in any school subject?

Unverifiable

What aspect of your full-time job did you find most interesting?

Futuristic

Do you intend to further your education?

Hypothetical Behavior

If you had the training, do you think you would enjoy building innovative model airplanes for a toy manufacturer?

Conjecture

If your father had been a chemist, do you think you would have performed chemistry experiments at home before you were 12 years old?

Interpretive

If you had the training, how would you estimate your performance as an appliance repair man?

General

As a child were you an avid collector of things?

Response Tendency

In buying a new camera, would you most likely purchase one with automatic features?

Internal Event

How important did you view homework when you were in high school?

Source: McKillip & Clark (1974).

- o Maintain a logical flow of questions for smooth administration.
- o Use clear and unambiguous questions.
- o Avoid "double-barreled" questions.
- o Avoid negative items.
- o Avoid "biased" items and terms.
- o Postpone sensitive questions until respondent is more at ease with the survey process.
- o Avoid acquiescence sets.

In light of these guidelines and recommendations for the formatting of inventories or surveys, some general comments can be made about the MSI, HOI, RBQ, MAP, and EBIS. The MSI and HOI, because of their true/false format are perhaps not ideal models for a future biodata inventory. Though this format lends itself well to brief items, other factors should be considered as well. Non-continuous variables contain less information and have lower validity coefficients than continuous items. True-false items do not provide an escape response or cover all the options that a respondent might want to choose. For example, the HOI item "I quit school because I was failing" is difficult to interpret since a "false" response could either mean that the respondent did not quit school or that the respondent quit, but not for that reason. Other examples of ambiguous items are "I have never done any heavy drinking" and "I have several hobbies." The literature suggests that the reliability of the items would be greater if numbers were used as anchors. As they stand now "heavy drinking" and "several hobbies" must be interpreted by the respondent. Both the HOI and MSI appear to be designed to tap personality dimensions or attitudes rather than factual information. The

former types of items, although they may predict the criterion, are more difficult to verify and may be less acceptable to the public than past behavior "factual" information for use in the military selection process. (Ethical issues are discussed in greater detail in the following section.)

For the most part, the MAP and RBQ conform to the recommendations found in the literature for formatting biodata inventories. They contain multiple-choice items with response options arranged along a continuum where appropriate. Respondents pick a single response and usually are provided an escape option. The MAP does not contain many sensitive items, but those it contains are introduced gradually and in a matter-of-fact manner. Similarly, there are few sensitive questions on the RBQ but one such item, "Have you ever been in trouble with the police other than for traffic tickets?" is introduced very early. Some of the MAP items are quite long (e.g., "During your last two years of school, how many hours a week did you usually spend on athletic activities, both in and out of school?" Also, the organization of items within the MAP and the RBQ might profit from a more logical flow. For example, the MAP begins with school-related items and then returns to such items after covering items on childhood, family service attitudes, work history, and general attitudes, and self concept. Finally, the procedure of having respondents mark their responses on a separate answer sheet, as is done for the MAP and RBQ, can be questioned. Respondents are likely to mismark options, and also, the practice of using separate questionnaire booklets and answer sheets makes the questionnaire appear longer. However, this procedure greatly reduces the cost of administration and helps safeguard the security of an instrument used in selection.

The EBIS, like the MAP and RBQ, generally follows the recommendations for biodata inventory construction. Unlike those inventories, however, the EBIS, for many items, asks respondents to mark all options that apply. This characteristic may be useful for research purposes since it permits more information to be gained from a relatively brief item, but it complicates data analyses. It would seem wise to stick to single response options for an operational inventory. The flow of questions in the EBIS is very logical, and its many sensitive questions are appropriately delayed. Though brief, it more than adequately covers its focused target topics.

As can be surmised, none of these inventories is a flawless biodata instrument since the inventory developer must make tradeoffs between often mutually exclusive objectives (e.g., making items unambiguous versus keeping them brief). An adequate base of validity data on reasonably well-constructed instruments is emerging, however, and this research base holds promise for the development of an inventory for operational use.

The Ethics of Biodata

The Military Services' current reliance on broad educational criteria (i.e., whether or not one possesses a high school diploma) as an enlistment screen is coming under increasing individual, institutional, and Congressional attack. No one would deny that possession of a high school diploma has been shown to be an excellent predictor of first term attrition. What is being argued is that current education enlistment policies are broad and imprecise measures of personnel performance which often deny enlistment opportunities to many potentially successful servicemembers. Biodata inventories offer new or additional screening procedures based on each individual's attributes rather than merely on membership in a broad educational category.

The Department of Defense certainly recognizes the importance of not denying enlistment to individuals because they are members of a group (Sellman, 1984). Biodata can perhaps guard against the appearance of class-action discrimination, either by using such data as a surrogate measure of education level or perhaps better by using it to make distinctions among individuals within education groups. Biographical information, used in conjunction with knowledge of the applicant's high school graduation status, may screen in nongraduates who have relatively good chances of completing their tour of duty. Thus, seen in this light, biodata can be used to promote more fair and ethical selection practices.

There are some further ethical considerations involved in the use of biodata. Biodata inventories, as was seen above, can contain items related to demographics, education, family background, work history, and so on.

Respondents have a good measure of control over some of their reported background characteristics (e.g., employment history, high school graduation status) but little or no control over other variables (e.g., family background). The use of the latter type of variable in selection is often regarded as unfair or discriminatory, and is in fact, legally prohibited to a large extent in the case of civilian employment. Care must be exercised in the use of predictive scales developed from biodata instruments to ensure that despite predictive relationships between background variables and attrition, enlistment applicants are not discriminated against because of specific characteristics, particularly ones over which there is little control. For example, family background items such as those eliciting information on parental drinking problems might be predictive, but they are also ethically questionable. Should an applicant be denied enlistment because of his or her parent's behavior? Caution is also advised regarding the potential for several background variables, seemingly under respondent control, to function as an empirically derived surrogate for demographic variables such as social class, race, or sex. Of course, as Owens (1976) mentions, the empirical derivation of biodata items and scoring keys guards against willful discrimination.

The use of sensitive questions must also be weighed. Certain family background questions, for example, while they may correlate with attrition, may be found offensive to the respondent and in violation of his or her privacy. Focused items with a high degree of face validity may be seen as less offensive and may in fact be less susceptible to distortion or faking (which can be a practical barrier to the operational use of biodata).

Military entry requirements are under the watchful eye of many. Particularly in these volunteer times, the Services must take care to balance their need for quality recruits against their obligation to provide enlistment opportunities to this nation's youth. The concerns addressed above dictate the prudent use of current and additional screening tools.

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